

Alp Sahin

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Education

Lehigh University (LU)

PhD in Mechanical Engineering

Bethlehem, PA

Aug. 2021 - Present

Worcester Polytechnic Institute (WPI)

MS in Robotics Engineering

Worcester, MA

Sep. 2019 - Jun. 2021

Thesis: Region-Based Planning for a 3D In-Hand Manipulation Platform Leveraging Variable Friction Fingers and External Surfaces

Bogazici University (BOUN)

BS in Mechanical Engineering

Istanbul, Turkey

Sep. 2014 - Jun. 2019

Thesis: Design and Development of an Optical Force Sensor for an Extensible Colonoscopy Robot

Research Experience

Autonomous and Intelligent Robotics Laboratory (AIR Lab)

Topological and Geometric Planning Algorithms for Locally Shortest Paths

Lehigh University

Aug. 2021 - Present

- Developed graph-search based path planning algorithms using C++, leveraging concepts from differential geometry
- Visualized the planning process via OpenCV and OpenGL

Manipulation and Environmental Robotics Lab (MER Lab)

Region-Based Planning for 3D Within-Hand-Manipulation via Variable Friction Fingers and Extrinsic Contacts

Worcester Polytechnic Institute

Jan. 2020 - Jun. 2021

- Simulated and tested a variable friction finger mechanism using ROS and Gazebo
- Developed user friendly interfaces using Qt for controlling the fingers and tuning simulation parameters
- Designed a novel region-based heuristic function and implemented a manipulation planning algorithm using Python
- Conducted real robot experiments on a Franka Emika Panda robotic arm and variable friction gripper assembly using MoveIt and the developed manipulation planning algorithm
- Presented and published results at 2021 IEEE International Conference on Robotics and Automation (ICRA), and as a part of MS Thesis at WPI

Robotics, Mobility and Cyberphysical Systems Lab

Development and Benchmarking of Feedback-Based Dynamic Data Acquisition Methods

Worcester Polytechnic Institute

May 2020 - Jun. 2021

- Implemented a feedback-based dynamic feature selection algorithm for supervised learning applications
- Developed a simulation and benchmarking framework to evaluate dynamic data collection policies
- Presented and published results at 2021 American Control Conference (ACC) and SAE WCX 2021 Digital Summit

Appointments and Professional Experience

Lehigh University

Research Assistant

Bethlehem, PA

Jan. 2022 - Present

Lehigh University

Teaching Assistant

Bethlehem, PA

Jan. 2022 - May 2022

- Supervised 50+ students at the lab during manufacturing tasks including: machining, plastic injection molding, sand casting, metal forming, welding

Beycelik GESTAMP Teknoloji ve Kalip A.S.

Tooling Process and Design Intern

Bursa, Turkey

Jan. 2019 - Feb. 2019

- Observed and participated in die design procedures in CATIA V5 software

TOFAS Turk Otomobil Fabrikasi A.S.

Press and Dies Production Intern

Bursa, Turkey

Jun. 2018 - Jul. 2018

- Automated the process capability reporting procedures for the stamped automobile parts using Office VBA
- Prepared a presentation on Lean Production and Six Sigma

GESTAMP Metalbages

Process Engineering Intern

Santpedor, Spain

Jul. 2017 - Aug. 2017

- Studied types of sheet metal forming lines including progressive dies and transfer dies featuring robotic arms

Technical Skills

Programming

Matlab, C++, Python, HTML, CSS, JavaScript, Mathematica, Qt, OpenCV, Office VBA

Professional Softwares

SolidWorks, ROS, Gazebo, V-REP, Ansys Fluent

Drawing & Typesetting

Inkscape, Office, L^AT_EX, Beamer

Manufacturing

Silicone moulding, Plastic injection, General machine shop skills

Languages

English(Fluent), Turkish(Native), German(advanced)

Publications

- [1] A. Sahin, A. J. Spiers and B. Calli, "Region-Based Planning for 3D Within-Hand-Manipulation via Variable Friction Robot Fingers and Extrinsic Contacts," *2021 IEEE International Conference on Robotics and Automation (ICRA)*, 2021, pp. 6549-6555, [[10.1109/ICRA48506.2021.9561376](https://doi.org/10.1109/ICRA48506.2021.9561376)].
- [2] A. Sahin and X. Zeng, "Feedback-Based Dynamic Feature Selection for Constrained Continuous Data Acquisition," *2021 American Control Conference (ACC)*, 2021, pp. 3507-3512, [[10.23919/ACC50511.2021.9483180](https://doi.org/10.23919/ACC50511.2021.9483180)].
- [3] A. Sahin and X. Zeng, "A Framework for Benchmarking Feedback-Based Dynamic Data Collection Methods in Connected Vehicle Networks," *SAE Technical Paper*, 2021, 2021-01-0184, [[10.4271/2021-01-0184](https://doi.org/10.4271/2021-01-0184)]

Awards and Honors

Rossin College Doctoral Student Support Program

Appointed as a Dean's Fellow

Lehigh University

Aug. 2021 - May 2022

Second Place at WPI Graduate Research Innovation Exchange (GRIE)

Presentation: Planning for Within-Hand Manipulation Using a Robotic Gripper

Worcester Polytechnic Institute

Apr. 2021

WPI Robotics Engineering Graduate Student Travel Award

For the attendance at the American Control Conference (ACC 2021)

Worcester Polytechnic Institute

Spring 2021

Leadership and Outreach Activities

Charting Horizons and Opportunities in Careers in Engineering and Science (CHOICES)

Robotics Activity Organizer

Lehigh University

Jun. 2022

- Developed an interactive capture the flag game using mobile robots equipped with raspberry pi
- Implemented a feedback linearization based controller and a motion planning algorithm for mobile robots leveraging motion capture data from Optitrack motion capture system
- Designed a user friendly interface for observing and commanding the robots through a mouse and a keyboard
- Presented the game to 20+ middle school students, who successfully navigated robots to their goals as a part of the activity

FORW-RD NSF NRT Program

MS Trainee

Worcester Polytechnic Institute

Aug. 2020 - May 2021

- Completed a course on Robot/AI Ethics featuring discussions on the communication of ethical and societal impacts of scientific research and technology development
- Participated in seminars and workshops focusing on user experience design and applications
- Included a broader impacts chapter in MS Thesis, focusing on the societal and ethical implications of the work

Bogazici University Underwater Sports Club (BUSAS)

Board Member and Diving Instructor

Bogazici University

Sep. 2014 - Jul. 2019

- Provided theoretical and in-water diving training across various certificate levels in CMAS
- Organized (transportation, accommodation, diving) 50+ people diving trips in Turkey as a member of the club board
- Managed and maintained club-owned diving equipment including breathable air cylinders, regulators, buoyancy vests, air compressors